

## **REMARKS**

### **Claim Amendments**

Claim 8 is amended to correct one minor typographical error. No new matter is added, as is evident from inspection of the claim. Entry of the amendment is respectfully requested.

### **Rejection of Claims**

Claims 1-30, of which claims 1, 13, 16 and 19 are independent, are rejected either as anticipated under USC §102(b) by, or alternatively, as obvious under §103 (a) in view of, US Published Patent Application US 2002/0159139 A1. US 2002/0159139 A1 published October 31, 2002 in the names of inventors Jeff Koplow, Dahv Kliner and Lew Goldberg and is referred to hereinafter as “Koplow.”

A brief general discussion of Koplow may be helpful. Koplow is directed generally to a polarization-maintaining (hereinafter “PM”) optical fiber amplifier that is fabricated from *non-PM* gain optical fiber. (Koplow, P. [0002]) (emphasis added). Optical fiber amplifiers are often based on “gain” fiber, which is a fiber having a rare earth doped core. (Koplow, P. [0004]). One notable disadvantage of optical fiber amplifiers is their tendency to scramble the input polarization of a polarized seed signal. (Koplow, P. [0005]). The best all around solution to this problem is to use PM optical gain fiber. (Koplow, P. [0010]). Unfortunately, accordingly to Koplow, PM gain fiber can be difficult to obtain, and that which is available is not appropriate for construction of higher power amplifiers. (Koplow, PP. [0014]-[0015]). Accordingly, Koplow teaches coiling a non PM gain fiber under tension around a spool so that optical fiber behaves as a PM gain fiber. (Koplow, P. [0034], 2<sup>nd</sup> sentence). The coiling results in stress induced linear birefringence (Koplow, P. [0036]), and such birefringence, if high enough, provides the non-PM gain fiber with PM behavior. (Koplow, P. [0010], 3<sup>rd</sup> sentence).

### **Rejection of Independent Claim 1 and Dependent Claims 2-12 and 20-26**

It is respectfully submitted that Koplow fails to anticipate claim 1. As the MPEP instructs, a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. (MPEP §2131, citing Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)). For anticipation “the identical invention must be shown in as complete detail as is

contained in the ... claim.” (MPEP §2131, citing Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)).

Claim 1 is directed to an optical fiber apparatus and recites, in addition to other limitations, “... wherein said length of fiber is positioned in a second position *that increases the bend loss* of said fiber relative to said first position such that, *responsive to said increased bend loss*, said apparatus can provide light having a reduced  $M^2$  parameter relative to said  $M^2$  parameter as well as a second polarization ratio for the selected linear polarization that is increased relative to said first polarization ratio ...”

Koplow fails to teach or suggest that the length of fiber is “positioned in a second position” (e.g., is bent into a coil as shown in FIGURE 3 of the Application) that *increases the bend loss* of the fiber relative to the first position. Koplow teaches the opposite. See, for example, Koplow at paragraph [0036]:

The non-PM gain optical fiber **32** is coiled under tension around the spool **34**, resulting in stress-induced linear birefringence. The spool diameter,  $d_{\text{spool}}$ , and tension induced axial strain,  $\epsilon$ , are chosen to provide sufficient birefringence for PM operation *without introducing significant bend loss*.

Koplow teaches coiling so as to provide a selected tension and axial strain to provide sufficient birefringence for PM operation, but, regarding bend loss, does not teach the above noted limitation recited in claim 1. The coiling under tension around a spool 34, resulting in the stress-induced linear birefringence, is to be accomplished *without introducing significant bend loss*.

Claim 1, on the other hand, specifically recites introducing bend loss, and furthermore recites the significance of the increased bend loss by reciting detail that the optical apparatus has specific attributes “*responsive to said increased bend loss*.” The recited attributes include that the apparatus can provide light having a “*reduced  $M^2$  parameter relative to said  $M^2$  parameter as well as a second polarization ratio for the selected linear polarization that is increased relative to said first polarization ratio*.” It is further noted that Koplow makes no mention whatsoever, and apparently is entirely unconcerned with,  $M^2$  parameter

Accordingly, at least for the foregoing reasons, it is respectfully submitted that Koplow fails to anticipate claim 1. Reconsideration and withdrawal of the rejection of claim 1 is respectfully requested.

Claims 2-12 and 20-26, which depend, directly or indirectly, from claim 1, are also rejected under Koplow. Such dependent claims incorporate by reference all the limitations of the base claim. Accordingly, at least for the reasons noted above, Koplow fails to anticipate the foregoing claims, and, in the case of claim 20, which is rejected as obvious under 35 USC §103, fails to teach or suggest the limitations of claim 20 or otherwise render claim 20 obvious. Reconsideration and withdrawal of the rejections of claims 2-12 and 20-26 is respectfully requested.

Other statements regarding the rejection or patentability of claim 1 and its progeny made in the Office Action need not be addressed, as they are rendered moot by the above demonstration of the failure of Koplow to teach or suggest the limitations of claim 1 noted above. Applicants disagree with the other bases for rejection, and no admission is to be inferred as to the appropriateness thereof based on Applicants not addressing these moot issues in these Remarks. Applicants reserve all rights, including the right to address any issues not addressed now at a later time in this or a different forum.<sup>1</sup>

#### Rejection of Independent Claim 13 and Dependent Claims 14-15 and 27-30

Apparatus claim 13 specifically recites “...wherein said fiber is positioned such that, *due to bend loss* and independent of auxiliary polarization apparatus, said higher order modes and said first polarization of said fundamental mode experience increased attenuation relative to when said fiber is substantially linearly orientated and are substantially attenuated and wherein said second polarization of said fundamental mode is substantially less attenuated than said first polarization of said fundamental mode.” Accordingly, with reference to the citations to Koplow noted above in the consideration of claim 1, it is respectfully submitted that Koplow fails to anticipate claim 13.

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<sup>1</sup> The Office Action at page 3 states that “[c]laims 2-12 recite inherent properties of the structure applied to claim 1.” No further explanation is provided. Although, as noted above, the rejection of dependent claims 2-12 in light of the noted defects regarding the rejection of claim 1 is moot, some comment may be appropriate regarding the burden the PTO has set for itself in rejecting a claim as inherently met. To meet the burden of an inherency rejection, the Office Action must provide a rationale or evidence tending to show inherency. The fact that a certain characteristic may be present in the prior art is not sufficient to establish the inherency of that result or characteristic (see MPEP §2112). The limitation must necessarily be present in the teachings of the reference, such that it would be recognized as such by persons of ordinary skill in the art (MPEP §2112 and §2131.01). Inherency may not be established by mere probabilities or possibilities (MPEP §2112). “In relying upon a theory of inherency, the Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art” (MPEP §2112, quoting *Ex parte Levy*, 17 USPQ2d 1461, 1464 (*Bd. Pat. App. & Int.* 1990) (emphasis in original quotation)).

Reconsideration and withdrawal of the rejection of claim 13 is respectfully requested.

Claims 14-15 and 27-30, depend, directly or indirectly, from claim 13 and are also rejected under Koplow. Such dependent claims incorporate by reference all the limitations of the base claim. Accordingly, at least for the reasons noted above regarding claim 13, Koplow fails to anticipate the foregoing claims, and, in the case of claim 27, which is rejected as obvious under 35 USC §103(a), fails to teach or suggest the limitations of claim 27 or otherwise render claim 27 obvious. Reconsideration and withdrawal of the rejections of claims 14-15 and 27-30 is respectfully requested.

Other statements regarding the rejection or patentability of claim 13 and its progeny made in the Office Action need not be addressed, as they are rendered moot by the above demonstration of the failure of Koplow to teach or suggest the limitation or limitations of claim 13 noted above. Applicants disagree with the other bases for rejection, and no admission is to be inferred as to the appropriateness thereof based on Applicants not addressing these moot issues in these Remarks. Applicants reserve all rights, including the right to address any issues not addressed now at a later time in this or a different forum.

#### Rejection of Independent Claim 16 and Dependent Claims 17-18

Claim 16 is rejected as anticipated by Koplow. Claim 16 reads as follows:

An optical apparatus comprising an optical fiber comprising a rare earth for providing light having a first wavelength responsive to being pumped by light having a second wavelength that is different than the first wavelength, the optical fiber being capable of propagating at the first wavelength a fundamental mode and at least one higher order mode, where each of the modes have orthogonal first and second linear polarizations, the first polarizations being substantially parallel, and wherein the effective modal index of the first polarization of the higher order mode at the first wavelength is greater than the effective modal index of the second polarization of the fundamental mode at the first wavelength.

Claim 16 recites numerous limitations to which Koplow makes no explicit reference. For example, Koplow includes no discussion of the optical fiber as recited above, namely, having modes having first and second polarizations recited above, where the first polarizations are parallel, and wherein the effective modal index of the first polarization of the higher order mode at the first wavelength is greater than the effective modal index of the second polarization of the fundamental mode at the first wavelength. Koplow does not discuss effective modal index at all,

barely mentions the existence of the possibility of higher order modes, and certainly does not include any teaching regarding the relationship between the effective modal indices of the polarization of certain modes, as specifically recited in claim 1. Accordingly, it is respectfully submitted that Koplow does not teach or suggest the invention as recited herein.<sup>2</sup>

It is respectfully submitted that Koplow fails to teach or suggest the invention of claim 16 and that claim 16 recites patentable subject matter. Reconsideration and withdrawal of the rejection of claim 16 is respectfully requested.

Claims 17-18 depend, directly or indirectly, from claim 16 and are also rejected under Koplow. Koplow, at least for the reasons noted above with regarding to claim 16, fails to teach or suggest the subject matter of claims 17-18. Other statements regarding the rejection or patentability of claim 16 and its progeny made in the Office Action need not be addressed, as they are rendered moot by the above demonstration of the failure of Koplow to teach or suggest the limitation or limitations of the base claim 16. Applicants disagree with the other bases for rejection, and no admission is to be inferred as to the appropriateness thereof based on Applicants not addressing these moot issues in these Remarks. Applicants reserve all rights, including the right to address any issues not addressed now at a later time in this or a different forum.

#### Rejection of Independent Claim 19

Claim 19 is a method claim, and, accordingly recites steps. Anticipation of claim 19 would at least require that a single reference show each step recited in the claim. However, in rejecting claim 19, the Office Action simply states, without elaboration and in a statement that addresses apparatus claims as well as method claim 19, that “[t]hese claims essentially read on the structure [of Koplow] applied to claims 1-12 ...” (Office Action, page 3). The Office Action does not identify specific portions of Koplow wherein each of the actions recited in claim 19 is taught in the same detail as recited in claim 19.

It is respectfully submitted that Koplow fails to teach or suggest the method recited in claim 19. Claim 19 specifically recites limitations pertaining to bend loss and  $M^2$  parameter, including the recitation of “bending the fiber so as to increase the bend loss of the higher order modes and the second linear polarization such that the fiber can provide the output light having

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<sup>2</sup> If the Office Action is making an inherency argument, the standard of Footnote 1 applies, which, it is respectfully submitted, the outstanding Office Action does not meet.

an improved beam quality in terms of  $M^2$  parameter and improved polarization ratio for light having the first polarization ...” As noted above in the analysis regarding independent claim 1, Koplow teaches that coiling under tension is to be done “without introducing significant bend loss” and does not address the  $M^2$  parameter, which is a measure of beam quality, whatsoever. Accordingly, it is respectfully submitted that Koplow fails to teach or suggest the invention recited in method claim 19. Reconsideration and withdrawal of the rejection of claim 19 is respectfully requested.

### **CONCLUSION**

This Response and Amendment attends to all issues raised in the outstanding Office Action. It is respectfully submitted that the claims recited patentable subject matter. Accordingly, reconsideration and withdrawal of the rejections is respectfully requested, as is passage of the case to issue.

No fee is considered to be due in conjunction with the submission of this Response and Amendment. However, if a fee is determined to be due, or if an underpayment or overpayment of a fee is made, authorization is hereby granted to charge or credit, as appropriate, Nufern Deposit Account No. 502343.

Please do not hesitate to contact the undersigned if any issues are deemed to remain unresolved.

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Respectfully submitted,

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